

TEST TITLE: AN/SPQ-14 ASDS SYNCHRO DECODER
OPERABILITY

TEST NO.: 45011-5-056
REV/CHG: A

COVER SHEET

TEST PROCEDURE PREPARATION:

Prepared by: NSWC PHD DAMNECK DET CODE 6E10 Date: 1 DEC 98
TDA Organization and Code

TEST PROCEDURE REVIEW:

Reviewed by: NSWC PHD DAMNECK DET CODE 6D10 Date: 4 JAN 99
TDM Organization and Code

DOCUMENTATION CERTIFICATION:

Approved by: _____ Date: _____
TDD Organization and Code

REVISION RECORD

<u>REV/CHG</u>	<u>DESCRIPTION</u>	<u>Approval</u>	
		<u>INITIAL</u>	<u>DATE</u>
-	Original Issue	NSWC	10 JAN 98
A	Incorporated validation changes.	FES	18 DEC 98

LIST OF EFFECTIVE PAGES

<u>PG-REV</u>	<u>PG-REV</u>	<u>PG-REV</u>	<u>PG-REV</u>	<u>PG-REV</u>	<u>PG-REV</u>	<u>PG-REV</u>
1 - A	2 - A	3 - A	4 - A	5 - A	6 - A	7 - A
8 - A	9 - A	10 - A	11 - A	12 - A	13 - A	14 - A
15 - A	16 - A	17 - A	18 - A	19 - A		

TEST OUTLINE

1. OBJECTIVE:

To verify that the 63812-204222 Decoder, RADDs to Synchro (63812-204222 Decoder) is operating properly with interfacing equipment.

2. ESTIMATED TESTING TIME:

1 hour

3. REFERENCES:

SE245-AE-MMO-A10, Technical Manual for the Radar Signal Distribution Switchboard SB-4229A(V)/SP, Addendum 3, EC-3

4. TEST OR SUPPORT EQUIPMENT AND MATERIAL:

<u>GENERIC NAME</u>	<u>QUANTITY</u>	<u>IDENTIFYING INFORMATION</u>
a. Oscilloscope	1	SCAT 4308 or equivalent
b. Synchro Tester	1	SCAT 4068 or equivalent

5. COMPUTER PROGRAMS REQUIRED:

None

6. PREREQUISITES:

- a. 45011-3-056, CV-3989 Analog to Digital Converter ILO and Functional Test
- b. 45011-3-063, AN/SPQ-14 ASDS Synchro Decoder ILO
- c. 45011-5-055, CV-3989(V)1/SP Analog to Digital Converter Operability

7. SPECIAL CONDITIONS AND SERVICES:

115 VAC, 1 ϕ , 60 Hz Power

8. EQUIPMENT INVOLVED IN TEST:

- a. 63812-204222 Decoder
- b. CV-3989/SP or CV-3989(V)1/SP Signal Data Converter
- c. Ships selected radar

9. CONFIGURATION:

No field changes required to run this test.

TEST OUTLINE

10. METHOD:

A Radar Display and Distribution System (RADDS) Data Stream input signal will be decoded with various levels and types of output signals to be verified. A synchro tester is used to verify antenna azimuth bearing information at the 63812-204222 Decoder output.

11. STATION ASSIGNMENTS:

<u>STATION</u>	<u>NO. PERSONNEL</u>	<u>COMMENTS</u>
63812-204222 Decoder	1 Electronic Technician	Performs Operability Test
Selected Radar	1 Operator	Operates Radar

SAFETY INSTRUCTIONS

- a. The operation of this equipment involves the use of high voltages that are dangerous to life. Extreme caution must be exercised at all times. Do not work on open or disassembled units when power is applied.
- b. Comply with ships regulations and safety precautions prior to antenna rotation and radiation. Remain clear of swing radius of rotating antennas.
- c. Test personnel will strictly adhere to all safety precautions including, but not limited to, all Cautions and Warnings contained in this test procedure and applicable documents.
- d. 1A1A1J4 Contacts carry 115 VAC. Avoid touching or shorting between contacts.

INITIAL CONDITIONS AND SETUP

<u>STEP</u>	<u>STATION</u>	<u>INSTRUCTIONS</u>
		<p><u>NOTE</u> Use a CV-3989/SP or CV-3989(V)1/SP that is being fed from an operational radar.</p>
1	63812-204222 Decoder	Ensure a proper RADDs Data stream is being supplied to RADDs 1 (J2), RADDs 2 (J3), and RADDs 3 (J4) input connectors for 63812-204222 Decoder modules (Part Number 204450-1) under test.
2	63812-204222 Decoder	Set AC POWER switch to OFF position.

TESTING STEPS

<u>STEP</u>	<u>STATION</u>	<u>INSTRUCTIONS</u>												
1	63812-204222 Decoder	Disconnect cable connection to SYNCHRO OUT (1A1A1J4) connector on module 1A1A1 (Part Number 204450-1). <div><u>WARNING</u> The 1A1A1J4 Contacts carry 115 VAC. Avoid touching or shorting between contacts.</div>												
2	63812-204222 Decoder	Connect synchro tester to 1A1A1J4 connector as follows: <table><tr><td><u>J4 Contact</u></td><td><u>Synchro Tester</u></td></tr><tr><td>A</td><td>S1</td></tr><tr><td>B</td><td>S2</td></tr><tr><td>C</td><td>S3</td></tr><tr><td>F</td><td>RH</td></tr><tr><td>G</td><td>RL</td></tr></table>	<u>J4 Contact</u>	<u>Synchro Tester</u>	A	S1	B	S2	C	S3	F	RH	G	RL
<u>J4 Contact</u>	<u>Synchro Tester</u>													
A	S1													
B	S2													
C	S3													
F	RH													
G	RL													
3	63812-204222 Decoder	Set AC POWER switch to ON and observe POWER ON indicator is lit.												
4	63812-204222 Decoder	Observe the following power indicators are lit on module 1A1A1 (Part Number 204450-1): <u>Power Indicator</u> -15V +15V +5V +24V 6.3 VAC												

BEARING TEST

5	Radar	<p>Set the associated radar to RELATIVE mode with the antenna to a fixed bearing between 0° and 90° using either the synchro amp for the associated radar or a radar display not associated with the 63812-204222 Decoder under test.</p> <p><u>RECORD</u> the ship antenna angle on Test Data Recording sheet.</p>
6	Synchro Tester	<p>Verify tester indicates same fixed azimuth angle as ships radar antenna $\pm 1^\circ$.</p> <p><u>RECORD</u> on Test Data Recording sheet.</p>

TESTING STEPS

<u>STEP</u>	<u>STATION</u>	<u>INSTRUCTIONS</u>
7	Radar	Set the antenna to a fixed bearing between 90° and 180° using either the synchro amp for the associated radar or a radar display not associated with the 63812-204222 Decoder under test. <u>RECORD</u> the ship antenna angle on Test Data Recording sheet.
8	Synchro Tester	Verify tester indicates same fixed azimuth angle as ships radar antenna $\pm 1^\circ$. <u>RECORD</u> on Test Data Recording sheet.
9	Radar	Set the antenna to a fixed bearing between 180° and 270° using either the synchro amp for the associated radar or a radar display not associated with the 63812-204222 Decoder under test. <u>RECORD</u> the ship antenna angle on Test Data Recording sheet.
10	Synchro Tester	Verify tester indicates same fixed azimuth angle as ships radar antenna $\pm 1^\circ$. <u>RECORD</u> on Test Data Recording sheet.
11	Radar	Set the antenna to a fixed bearing between 270° and 359° using either the synchro amp for the associated radar or a radar display not associated with the 63812-204222 Decoder under test. <u>RECORD</u> the ship antenna angle on Test Data Recording sheet.
12	Synchro Tester	Verify tester indicates same fixed azimuth angle as ships radar antenna $\pm 1^\circ$. <u>RECORD</u> on Test Data Recording sheet.
13	Radar	Rotate the associated antenna.
14	Synchro Tester	Verify tester indicates azimuth rotation in the correct direction. <u>RECORD</u> on Test Data Recording sheet.
15	63812-204222 Decoder	Set AC POWER switch to OFF position.

TESTING STEPS

<u>STEP</u>	<u>STATION</u>	<u>INSTRUCTIONS</u>
16	63812-204222 Decoder	Reconnect cable mating to SYNCHRO OUT (1A1A1J4) connector on module 1A1A1 (Part Number 204450-1).
<u>TRIGGER OUTPUTS</u>		
17	63812-204222 Decoder	Disconnect cable connection to TM (1A1A1J1) connector on module 1A1A1 (Part Number 204450-1).
18	63812-204222 Decoder	Using an oscilloscope, connect a 75-Ohm terminator to one side of a T-Connector and connect the other side to jack TM (1A1A1J1) on Module 1A1A1 (Part Number 204450-1).
19	63812-204222 Decoder	Set AC POWER switch to ON position.
20	Oscilloscope	Verify output signal from TM (1A1A1J1) is present and has a pulse amplitude of +20 VDC \pm 5 VDC, and a duration of 4 μ s \pm 1 μ s. <u>RECORD</u> on Test Data Recording sheet.
21	63812-204222 Decoder	Reconnect cable mating to TM (1A1A1J1) connector on module 1A1A1 (Part Number 204450-1).
22	63812-204222 Decoder	Disconnect cable connection to TE (1A1A1J2) connector on module 1A1A1 (Part Number 204450-1).
23	63812-204222 Decoder	Using an oscilloscope, connect a 75-Ohm terminator to one side of a T-Connector and connect the other side to jack TE (1A1A1J2) on Module 1A1A1 (Part Number 204450-1).

NOTE

The presence of a signal at output jack is dependent on the presence of a TE trigger in the RADDs Data Stream.

TESTING STEPS

<u>STEP</u>	<u>STATION</u>	<u>INSTRUCTIONS</u>
24	Oscilloscope	Verify output signal from TE (1A1A1J2) is present and has a pulse amplitude of +20 VDC \pm 5 VDC, and a duration of 1 μ s \pm 0.25 μ s. <u>RECORD</u> on Test Data Recording sheet.
25	63812-204222 Decoder	Reconnect cable mating to TE (1A1A1J2) connector on module 1A1A1 (Part Number 204450-1).
26	63812-204222 Decoder	Disconnect cable connection to TH (1A1A1J3) connector on module 1A1A1 (Part Number 204450-1).
<u>NOTE</u>		
The presence of a signal at output jack is dependent on the presence of a TH/TIFF Trigger in the RADDs Data Stream.		
27	Oscilloscope	Verify output signal from TH (1A1A1J3) is present and has a pulse amplitude of +20 VDC \pm 5 VDC, and a duration of 2 μ s \pm 0.5 μ s. <u>RECORD</u> on Test Data Recording sheet.
28	63812-204222 Decoder	Reconnect cable mating to TH (1A1A1J3) connector on module 1A1A1 (Part Number 204450-1).
29		Repeat steps 1 thru 28 for module (Part Number 204450-1) installed in 1A1A2 location using RADDs 2 input jack (J3).
30		Repeat steps 1 thru 28 for module (Part Number 204450-1) installed in 1A1A3 location using RADDs 3 input jack (J4).

SHUTDOWN AND SECURING

<u>STEP</u>	<u>STATION</u>	<u>INSTRUCTIONS</u>
1	63812-204222 Decoder	Set AC POWER switch to OFF position.

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OPERABILITY

TEST NO.: 45011-5-056
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TEST DATA RECORDING

EQUIPMENT UNDER TEST

EQUIPMENT

63812-204222 Decoder

SERIAL NO.

PREREQUISITES

- a. 45011-3-056, CV-3989 Analog to Digital Converter ILO and Functional Test
- b. 45011-3-063, AN/SPQ-14 ASDS Synchro Decoder ILO
- c. 45011-5-055, CV-3989(V)1/SP Analog to Digital Converter Operability

Prerequisites Completed: _____ **Signature and Date:** _____

NOTE

Write "N/A" in ACTUAL RESULTS spaces for test sections where modules are not present in the 63812-204222 Decoder under test.

TEST DATA RECORDING

<u>STEP</u>	<u>TEST ELEMENT</u>	<u>EXPECTED RESULTS</u>	<u>ACTUAL RESULTS</u>
5	<u>SHIPS ANTENNA ANGLE</u>	0° – 90°	_____ Deg.
6	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle $\pm 1^\circ$	_____ Deg.
7	<u>SHIPS ANTENNA ANGLE</u>	90° – 180°	_____ Deg.
8	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle $\pm 1^\circ$	_____ Deg.
9	<u>SHIPS ANTENNA ANGLE</u>	180° – 270°	_____ Deg.
10	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle $\pm 1^\circ$	_____ Deg.
11	<u>SHIPS ANTENNA ANGLE</u>	270° – 359°	_____ Deg.
12	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle $\pm 1^\circ$	_____ Deg.
14	<u>TESTER'S INDICATED AZIMUTH</u>	Rotation	_____

SHIP HULL NO.

TEST CONDUCTOR
SIGNATURE

GOVERNMENT WITNESS
SIGNATURE

DATE

TEST DATA RECORDING

STEP	ACTUAL TEST ELEMENT	EXPECTED	
		RESULTS	RESULTS
20	<u>TM (J1) OUTPUT TEST</u>		
	<u>1A1A1</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	4 μ s	3.0 μ s to 5.0 μ s	_____ μ s
	<u>1A1A2</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	4 μ s	3.0 μ s to 5.0 μ s	_____ μ s
	<u>1A1A3</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	4 μ s	3.0 μ s to 5.0 μ s	_____ μ s
24	<u>TE (J2) OUTPUT TEST</u>		
	<u>1A1A1</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	1 μ s	0.75 μ s to 1.25 μ s	_____ μ s
	<u>1A1A2</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	1 μ s	0.75 μ s to 1.25 μ s	_____ μ s
	<u>1A1A3</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	1 μ s	0.75 μ s to 1.25 μ s	_____ μ s
27	<u>TH (J3) OUTPUT TEST</u>		
	<u>1A1A1</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	2 μ s	1.5 μ s to 2.5 μ s	_____ μ s
	<u>1A1A2</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	2 μ s	1.5 μ s to 2.5 μ s	_____ μ s
	<u>1A1A3</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	2 μ s	1.5 μ s to 2.5 μ s	_____ μ s

SHIP HULL NO.	TEST CONDUCTOR SIGNATURE	GOVERNMENT WITNESS SIGNATURE	DATE
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TEST DATA RECORDING

<u>STEP</u>	<u>ACTUAL TEST ELEMENT</u>	<u>EXPECTED</u>	
		<u>RESULTS</u>	<u>RESULTS</u>
29	<u>1A1A2 DECODER MODULE</u>		
5	<u>SHIPS ANTENNA ANGLE</u>	0° – 90°	_____ Deg.
6	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle ±1°	_____ Deg.
7	<u>SHIPS ANTENNA ANGLE</u>	90° – 180°	_____ Deg.
8	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle ±1°	_____ Deg.
9	<u>SHIPS ANTENNA ANGLE</u>	180° – 270°	_____ Deg.
10	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle ±1°	_____ Deg.
11	<u>SHIPS ANTENNA ANGLE</u>	270° – 359°	_____ Deg.
12	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle ±1°	_____ Deg.
14	<u>TESTER'S INDICATED AZIMUTH</u>	Rotation	_____
20	<u>TM (J1) OUTPUT TEST</u>		
	<u>1A1A1</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	4 μs	3.0 μs to 5.0 μs	_____ μs
	<u>1A1A2</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	4 μs	3.0 μs to 5.0 μs	_____ μs
	<u>1A1A3</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	4 μs	3.0 μs to 5.0 μs	_____ μs

SHIP HULL NO.

TEST CONDUCTOR
SIGNATURE

GOVERNMENT WITNESS
SIGNATURE

DATE

TEST DATA RECORDING

<u>STEP</u>	<u>TEST ELEMENT</u>	<u>EXPECTED RESULTS</u>	<u>ACTUAL RESULTS</u>
24	<u>TE (J2) OUTPUT TEST</u>		
	<u>1A1A1</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	1 μ s	0.75 μ s to 1.25 μ s	_____ μ s
	<u>1A1A2</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	1 μ s	0.75 μ s to 1.25 μ s	_____ μ s
	<u>1A1A3</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	1 μ s	0.75 μ s to 1.25 μ s	_____ μ s
27	<u>TH (J3) OUTPUT TEST</u>		
	<u>1A1A1</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	2 μ s	1.5 μ s to 2.5 μ s	_____ μ s
	<u>1A1A2</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	2 μ s	1.5 μ s to 2.5 μ s	_____ μ s
	<u>1A1A3</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	2 μ s	1.5 μ s to 2.5 μ s	_____ μ s
30	<u>1A1A3 DECODER MODULE</u>		
5	<u>SHIPS ANTENNA ANGLE</u>	0° – 90°	_____ Deg.
6	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle $\pm 1^\circ$	_____ Deg.
7	<u>SHIPS ANTENNA ANGLE</u>	90° – 180°	_____ Deg.
8	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle $\pm 1^\circ$	_____ Deg.
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<u>SHIP HULL NO.</u>	<u>TEST CONDUCTOR</u>	<u>GOVERNMENT WITNESS</u>	<u>DATE</u>
	SIGNATURE	SIGNATURE	

TEST DATA RECORDING

<u>STEP</u>	<u>ACTUAL TEST ELEMENT</u>	<u>EXPECTED</u>	
		<u>RESULTS</u>	<u>RESULTS</u>
9	<u>SHIPS ANTENNA ANGLE</u>	180° – 270°	_____ Deg.
10	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle $\pm 1^\circ$	_____ Deg.
11	<u>SHIPS ANTENNA ANGLE</u>	270° – 359°	_____ Deg.
12	<u>TESTER'S INDICATED AZIMUTH</u>	Ship Antenna Angle $\pm 1^\circ$	_____ Deg.
14	<u>TESTER'S INDICATED AZIMUTH</u>	Rotation	_____
20	<u>TM (J1) OUTPUT TEST</u>		
	<u>1A1A1</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	4 μ s	3.0 μ s to 5.0 μ s	_____ μ s
	<u>1A1A2</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	4 μ s	3.0 μ s to 5.0 μ s	_____ μ s
	<u>1A1A3</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	4 μ s	3.0 μ s to 5.0 μ s	_____ μ s
24	<u>TE (J2) OUTPUT TEST</u>		
	<u>1A1A1</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	1 μ s	0.75 μ s to 1.25 μ s	_____ μ s
	<u>1A1A2</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	1 μ s	0.75 μ s to 1.25 μ s	_____ μ s
	<u>1A1A3</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____ VDC
	1 μ s	0.75 μ s to 1.25 μ s	_____ μ s
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<u>SHIP HULL NO.</u>	<u>TEST CONDUCTOR SIGNATURE</u>	<u>GOVERNMENT WITNESS SIGNATURE</u>	<u>DATE</u>

TEST DATA RECORDING

<u>STEP</u>	<u>ACTUAL TEST ELEMENT</u>	<u>EXPECTED</u>	
		<u>RESULTS</u>	<u>RESULTS</u>
27	<u>TH (J3) OUTPUT TEST</u>		
	<u>1A1A1</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	2 μ s	1.5 μ s to 2.5 μ s	_____ μ s
	<u>1A1A2</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	2 μ s	1.5 μ s to 2.5 μ s	_____ μ s
	<u>1A1A3</u>		
	+20.0 VDC	+15.0 VDC to +25.0 VDC	_____VDC
	2 μ s	1.5 μ s to 2.5 μ s	_____ μ s

SHIP HULL NO.

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OPERABILITY

TEST NO.: 45011-5-056
REV/CHG: A

TEST EQUIPMENT USED

List all test equipment utilized in the test including all general and specialized test equipment, special test cables, attenuators, and any other materials requiring calibration. Include extra sheets as necessary to identify all test equipment.

<u>GENERIC NAME</u>	<u>MODEL</u>	<u>SERIAL NO.</u>	<u>CALIBRATION DUE DATE</u>	<u>REMARKS</u>
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<u>SHIP HULL NO.</u>	<u>TEST CONDUCTOR SIGNATURE</u>	<u>GOVERNMENT WITNESS SIGNATURE</u>	<u>DATE</u>
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COMMENTS

This sheet is provided for the test conductor or Government witness to make appropriate comments including the following:

- a. Visual observations of dynamic responses;
- b. Erratic or unusual equipment behavior;
- c. Operational or handling difficulties;
- d. Procedural corrections;
- e. Equipment malfunctions;
- f. Discrepancies noted during test conduct; and,
- g. Waivers including reference to authorization document, i.e., letter, message, etc.

Indicate if a Test Problem Report (TPR) was generated with respect to these or other problems.

SHIP HULL NO.

TEST CONDUCTOR
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GOVERNMENT WITNESS
SIGNATURE

DATE
